

1 **CLAIMS**

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3 1. In a computer system, a method comprising dynamically generating a
4 schema to represent multiple hierarchies of inter-object relationships between a
5 plurality of objects in a data polyarchy, the schema being generated based on
6 values of attributes of the objects.

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8 2. A method as recited in claim 1, wherein the inter-object relationships
9 comprise a flat relationship, a hierarchical relationship, and multiple intersecting
10 hierarchies of relationships.

11
12 3. A method as recited in claim 1, where the objects comprise enterprise
13 resource planning (ERP) objects, directory based objects, or database objects.

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15 4. A method as recited in claim 1, wherein generating the schema
16 further comprises:

17 identifying a plurality of attributes of interest based on values of attributes
18 of the objects;

19 identifying one or more dimensions of inter-object relationships within
20 which objects that comprise at least a subset of the attributes of interest participate.

21
22 5. A method as recited in claim 1, wherein the schema is designed to
23 provide access control to organizational resources.

1 6. A method as recited in claim 1, further comprising communicating
2 the schema to a client, the schema identifying how the client can access objects in
3 the data polyarchy.

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5 7. A method as recited in claim 1, further comprising:
6 receiving a request from a client based on the schema; and
7 responsive to receiving the request:
8 accessing an object of the objects based on the request;
9 transforming the object into transformed data that expresses any
10 inter-object relationship between the object and any other object of the objects
11 based on the request; and
12 issuing the transformed data to the client.

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14 8. A method as recited in claim 7, wherein the transformed data
15 expresses the inter-object relationships with respect to other objects in a same
16 dimension or other objects in a different dimension, the same and/or the different
17 dimension being indicated by the request.

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19 9. A method as recited in claim 7, wherein the request comprises a
20 limiting attribute to limit the transformed data by presenting the one or more
21 objects only with respect to the limiting attribute.

1 **10.** A method as recited in claim 7, wherein the request queries for
2 information corresponding to an object in the data polyarchy with respect to one or
3 more particular dimensions.

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5 **11.** A method as recited in claim 7, wherein the request comprises a
6 dimension indicator to specify one or more hierarchies within which the data is to
7 be presented in the transformed data.

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9 **12.** A method as recited in claim 7, wherein the request further
10 comprises a distinguishing attribute, a classifying attribute, or a locating attribute.

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12 **13.** A method as recited in claim 7, wherein the request comprises a
13 dimension information modifier to specify a particular direction and a particular
14 depth to retrieve information from the data polyarchy.

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16 **14.** A method as recited in claim 13, wherein the dimension information
17 modifier is a siblings indication to retrieve all objects with a same parent as a
18 current object in the data polyarchy.

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20 **15.** A method as recited in claim 7, wherein the request indicates that at
21 least one subset of the objects comprise a similar attribute; and wherein accessing
22 one or more objects further comprises:

23 retrieving the one or more objects in a manner that is independent of any
24 hierarchical data relationship between the data objects in the at least one subset.
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1 **16.** A method as recited in claim 15, wherein the similar attribute
2 comprises a logical domain selected from a distinguishing domain, a locating
3 domain or a classifying domain.
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5 **17.** A method as recited in claim 7, wherein the request corresponds to
6 at least a first and second subset of the objects, the request comprising a logical
7 modifier that specifies an operation, and wherein the method further comprises:

8 responsive to receiving the request, identifying at least a portion of the first
9 and second subsets of directory objects in the polyarchical data set; and

10 wherein transforming the one or more objects further comprises performing
11 the operation on the first and second subsets.
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13 **18.** A method as recited in claim 17, wherein the logical modifier is a
14 Boolean modifier.
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16 **19.** A method as recited in claim 17, wherein the operation comprises
17 any combination of filtering, union, intersection, join, and/or exclusion operations.
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19 **20.** A method as recited in claim 7, wherein accessing the object further
20 comprises accessing the object in a manner that is independent of any inter-object
21 relationship between the object and any other object of the objects in a manner that
22 is independent of any definition of a hierarchy in the data polyarchy.
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1 **21.** A method as recited in claim 7, wherein accessing the object further
2 comprises querying the data polyarchy for the object.

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4 **22.** A method as recited in claim 7, wherein accessing the object further
5 comprises managing, manipulating, or modifying the object or a relationship
6 between the object and one of more of the other objects.

7
8 **23.** A computer-readable medium having computer-executable
9 instructions comprising instructions for:

10 dynamically generating a schema to represent multiple hierarchies of inter-
11 object relationships between a plurality of objects in a data polyarchy, the schema
12 being generated based on values of attributes of the objects, the schema indicating
13 each attribute of interest in the data polyarchy, the schema further indicating any
14 of one or more dimensions of inter-object relationships within which objects that
15 comprise at least a subset of the attributes of interest participate.

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17 **24.** A computer-readable medium as recited in claim 23, wherein the
18 inter-object relationships comprise a flat relationship, a hierarchical relationship,
19 and multiple intersecting hierarchies of relationships.

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21 **25.** A computer-readable medium as recited in claim 23, where the
22 objects comprise enterprise resource planning (ERP) objects, directory based
23 objects, or database objects.

1 26. A computer-readable medium as recited in claim 23, further
2 comprising computer-executable instructions for communicating the schema to a
3 client to indicate how the client is to interface with the objects in the data
4 polyarchy.

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6 27. A computer-readable medium as recited in claim 23, further
7 comprising computer-executable instructions for:

8 receiving a request from a client based on the schema;

9 responsive to receiving the request:

10 accessing at least one object in the data polyarchy based on the
11 request;

12 transforming the at least one object into transformed data that
13 expresses any inter-object relationship between the at least one object and any
14 other objects of the objects based on the request; and

15 issuing the transformed data to the client.

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17 28. A computer-readable medium as recited in claim 27, wherein the
18 transformed data expresses the inter-object relationships with respect to other
19 objects in a same dimension or other objects in a different dimension, the same
20 and/or the different dimension being indicated by the request.

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22 29. A computer-readable medium as recited in claim 27, wherein the
23 request comprises a limiting attribute to limit the transformed data by presenting
24 the one or more objects only with respect to the limiting attribute.
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1 **30.** A computer-readable medium as recited in claim 27, wherein the
2 request queries for information corresponding to an object in the data polyarchy
3 with respect to one or more particular dimensions.

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5 **31.** A computer-readable medium as recited in claim 27, wherein the
6 request comprises a dimension indicator to specify one or more hierarchies within
7 which the data is to be presented in the transformed data.

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9 **32.** A computer-readable medium as recited in claim 27, wherein the
10 request further comprises a distinguishing attribute, a classifying attribute, or a
11 locating attribute.

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13 **33.** A computer-readable medium as recited in claim 27, wherein the
14 request comprises a dimension information modifier to specify a particular
15 direction and a particular depth to retrieve information from the data polyarchy.

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17 **34.** A computer-readable medium as recited in claim 33, wherein the
18 dimension information modifier is a siblings indication to retrieve all objects with
19 a same parent as a current object in the data polyarchy.
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1 35. A computer-readable medium as recited in claim 27 wherein the
2 request indicates that at least one subset of the objects comprise a similar attribute;
3 and wherein the computer-executable instructions for accessing one or more
4 objects further comprise instructions for:

5 retrieving the one or more objects in a manner that is independent of any
6 hierarchical data relationship between the data objects in the at least one subset.

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8 36. A computer-readable medium as recited in claim 35, wherein the
9 similar attribute comprises a logical domain selected from a distinguishing
10 domain, a locating domain or a classifying domain.

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12 37. A computer-readable medium as recited in claim 27, wherein the
13 request corresponds to at least a first and second subset of the objects, the request
14 comprising a logical modifier that specifies an operation, and wherein the
15 computer-executable instructions further comprise instructions for:

16 responsive to receiving the request, identifying at least a portion of the first
17 and second subsets of directory objects in the polyarchical data set; and

18 wherein transforming the one or more objects further comprises performing
19 the operation on the first and second subsets.

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21 38. A computer-readable medium as recited in claim 37, wherein the
22 logical modifier is a Boolean modifier.

1 **39.** A computer-readable medium as recited in claim 37, wherein the
2 operation comprises any combination of filtering, union, intersection, join, and/or
3 exclusion operations.

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5 **40.** A computer-readable medium as recited in claim 27, wherein
6 accessing the at least one object further comprises accessing the at least one object
7 in a manner that is independent of any inter-object relationship between the at least
8 one object and any other object of the objects in a manner that is independent of
9 any definition of a hierarchy in the data polyarchy.

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11 **41.** A computer-readable medium as recited in claim 27, wherein
12 accessing the at least one object further comprises querying the data polyarchy for
13 the at least one object.

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15 **42.** A computer-readable medium as recited in claim 27, wherein
16 accessing the at least one object further comprises managing, manipulating, or
17 modifying the at least one object or a relationship between the at least one object
18 and one of more different objects of the objects.

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20 **43.** A computer comprising:
21 a memory comprising the computer-executable instructions; and
22 a processor coupled to the memory, the processor being configured to fetch
23 and execute the computer-executable instructions for:

24 dynamically generating a schema to represent multiple hierarchies of
25 inter-object relationships between a plurality of objects in a data polyarchy, the

1 schema being generated based on values of attributes of the objects, the schema
2 indicating each attribute of interest in the data polyarchy, the schema further
3 indicating any of one or more dimensions of inter-object relationships within
4 which objects that comprise at least a subset of the attributes of interest participate.
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6 **44.** A computer as recited in claim 43, wherein the inter-object
7 relationships comprise a flat relationship, a hierarchical relationship, and multiple
8 intersecting hierarchies of relationships.
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10 **45.** A computer as recited in claim 43, where the objects comprise
11 enterprise resource planning (ERP) objects, directory based objects, or database
12 objects.
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14 **46.** A computer as recited in claim 43, wherein the computer-executable
15 instructions further comprise instructions for communicating the schema to a
16 client to indicate how the client is to interface with the objects in the data
17 polyarchy.
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1 **47.** A computer as recited in claim 43, wherein the computer-executable
2 instructions further comprise instructions for:

3 receiving a request from a client based on the schema;

4 responsive to receiving the request:

5 accessing one or more objects in the data polyarchy based on the
6 request;

7 transforming the one or more of the objects into transformed data
8 that expresses any inter-object relationships based on the request; and

9 issuing the transformed data to the client.

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11 **48.** A computer as recited in claim 47, wherein the transformed data
12 expresses the inter-object relationships with respect to other objects in a same
13 dimension or other objects in a different dimension, the same and/or the different
14 dimension being indicated by the request.

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16 **49.** A computer as recited in claim 47, wherein the request comprises a
17 limiting attribute to limit the transformed data by presenting the one or more
18 objects only with respect to the limiting attribute.

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20 **50.** A computer as recited in claim 47, wherein the request queries for
21 information corresponding to an object in the data polyarchy with respect to one or
22 more particular dimensions.

1 51. A computer as recited in claim 47, wherein the request comprises a
2 dimension indicator to specify one or more hierarchies within which the data is to
3 be presented in the transformed data.

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5 52. A computer as recited in claim 47, wherein the request further
6 comprises a distinguishing attribute, a classifying attribute, or a locating attribute.

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8 53. A computer as recited in claim 47, wherein the request comprises a
9 dimension information modifier to specify a particular direction and a particular
10 depth to retrieve information from the data polyarchy.

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12 54. A computer as recited in claim 53, wherein the dimension
13 information modifier is a siblings indication to retrieve all objects with a same
14 parent as a current object in the data polyarchy.

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16 55. A computer as recited in claim 47, wherein the request indicates that
17 at least one subset of the objects comprise a similar attribute; and wherein the
18 computer-executable instructions for accessing one or more objects further
19 comprise instructions for:

20 retrieving the one or more objects in a manner that is independent of any
21 hierarchical data relationship between the data objects in the at least one subset.

1 **56.** A computer as recited in claim 55, wherein the similar attribute
2 comprises a logical domain selected from a distinguishing domain, a locating
3 domain or a classifying domain.

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5 **57.** A computer as recited in claim 47, wherein the request corresponds
6 to at least a first and second subset of the objects, the request comprising a logical
7 modifier that specifies an operation, and wherein the computer-executable
8 instructions further comprise instructions for:

9 responsive to receiving the request, identifying at least a portion of the first
10 and second subsets of directory objects in the polyarchical data set; and

11 wherein transforming the one or more objects further comprises performing
12 the operation on the first and second subsets.

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14 **58.** A computer as recited in claim 57, wherein the logical modifier is a
15 Boolean modifier.

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17 **59.** A computer as recited in claim 57, wherein the operation comprises
18 any combination of filtering, union, intersection, join, and/or exclusion operations.

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20 **60.** A computer as recited in claim 47, wherein accessing the one or
21 more objects further comprises accessing the one or more objects in a manner that
22 is independent of any inter-object relationship between the one or more objects
23 and any other object of the objects in a manner that is independent of any
24 definition of a hierarchy in the data polyarchy.

1 **61.** A computer as recited in claim 47, wherein accessing the one or
2 more objects further comprises querying the data polyarchy for the one or more
3 objects.
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5 **62.** A computer as recited in claim 47, wherein accessing the one or
6 more objects further comprises managing, manipulating, or modifying the one or
7 more objects or a relationship between an object of the one or more objects and
8 one of more different objects of the objects.
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10 **63.** A computer comprising:
11 processing means for dynamically generating a schema to represent
12 multiple hierarchies of inter-object relationships between a plurality of objects in a
13 data polyarchy, the schema being generated based on values of attributes of the
14 objects, the schema indicating each attribute of interest in the data polyarchy, the
15 schema further indicating any of one or more dimensions of inter-object
16 relationships within which objects that comprise at least a subset of the attributes
17 of interest participate.
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19 **64.** A computer as recited in claim 63, wherein the inter-object
20 relationships comprise a flat relationship, a hierarchical relationship, and multiple
21 intersecting hierarchies of relationships.
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1 65. A computer as recited in claim 63, where the objects comprise
2 enterprise resource planning (ERP) objects, directory based objects, or database
3 objects.
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5 66. A computer as recited in claim 63, further comprising processing
6 means for communicating the schema to a client to indicate how the client is to
7 interface with the objects in the data polyarchy.
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9 67. A computer as recited in claim 63, further comprising processing
10 means for:

11 receiving a request from a client based on the schema;

12 responsive to receiving the request:

13 accessing one or more objects in the data polyarchy based on the
14 request;

15 transforming the one or more of the objects into transformed data
16 that expresses any inter-object relationships based on the request; and

17 issuing the transformed data to the client.
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19 68. A computer as recited in claim 67, wherein the transformed data
20 expresses the inter-object relationships with respect to other objects in a same
21 dimension or other objects in a different dimension, the same and/or the different
22 dimension being indicated by the request.
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1 69. A computer as recited in claim 67, wherein the request comprises a
2 limiting attribute to limit the transformed data by presenting the one or more
3 objects only with respect to the limiting attribute.

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5 70. A computer as recited in claim 67, wherein the request queries for
6 information corresponding to an object in the data polyarchy with respect to one or
7 more particular dimensions.

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9 71. A computer as recited in claim 67, wherein the request comprises a
10 dimension indicator to specify one or more hierarchies within which the data is to
11 be presented in the transformed data.

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13 72. A computer as recited in claim 67, wherein the request further
14 comprises a distinguishing attribute, a classifying attribute, or a locating attribute.

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16 73. A computer as recited in claim 67, wherein the request comprises a
17 dimension information modifier to specify a particular direction and a particular
18 depth to retrieve information from the data polyarchy.

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20 74. A computer as recited in claim 73, wherein the dimension
21 information modifier is a siblings indication to retrieve all objects with a same
22 parent as a current object in the data polyarchy.

1 75. A computer as recited in claim 67, wherein the request indicates that
2 at least one subset of the objects comprise a similar attribute; and wherein the
3 means for accessing one or more objects further comprise means for:

4 retrieving the one or more objects in a manner that is independent of any
5 hierarchical data relationship between the data objects in the at least one subset.
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7 76. A computer as recited in claim 75, wherein the similar attribute
8 comprises a logical domain selected from a distinguishing domain, a locating
9 domain or a classifying domain.
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11 77. A computer as recited in claim 67, wherein the request corresponds
12 to at least a first and second subset of the objects, the request comprising a logical
13 modifier that specifies an operation, and wherein the processing means further
14 comprise means for:

15 responsive to receiving the request, identifying at least a portion of the first
16 and second subsets of directory objects in the polyarchical data set; and

17 wherein transforming the one or more objects further comprises performing
18 the operation on the first and second subsets.
19

20 78. A computer as recited in claim 77, wherein the logical modifier is a
21 Boolean modifier.
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23 79. A computer as recited in claim 77, wherein the operation comprises
24 any combination of filtering, union, intersection, join, and/or exclusion operations.
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80. A computer as recited in claim 67, wherein the means for accessing the one or more objects further comprises means for accessing the one or more objects in a manner that is independent of any inter-object relationship between the one or more objects and any other object of the objects in a manner that is independent of any definition of a hierarchy in the data polyarchy.

81. A computer as recited in claim 67, wherein the means for accessing the one or more objects further comprises querying the data polyarchy for the one or more objects.

82. A computer as recited in claim 67, wherein the means for accessing the one or more objects further comprises means for managing, manipulating, or modifying the one or more objects or a relationship between an object of the one or more objects and one of more different objects of the objects.

83. A polyarchical query language data structure comprising:
a first data field to specify a particular schema, the particular schema indicating how to meaningfully present or manage a plurality of objects in a data polyarchy based on values of attributes in the objects; and
a second data field to indicate an attribute of interest; and
a third data field to indicate how one or more objects comprising the attribute of interest are to be presented or managed with respect to one or more participating dimensions of inter-object relationships which are based on the schema.

1 **84.** A polyarchical query language data structure as recited in claim 83
2 further comprising a fourth data field to indicate a physical access strategy with
3 respect to the data polyarchy, the physical access strategy being identified by
4 indicating that the attribute of interest belongs to a distinguishing domain, a
5 classifying domain, or a locating domain.

6
7 **85.** A polyarchical query language data structure as recited in claim 83,
8 wherein the third data field further comprises a modifier to limit the one or more
9 objects.

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11 **86.** A polyarchical query language data structure as recited in claim 83,
12 wherein the third data field further comprises a logical modifier to limit the one or
13 more objects.

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15 **87.** A polyarchical query language data structure as recited in claim 83,
16 wherein the third data field further comprises a dimension information indicator
17 for specifying a dimension within which to present the one or more objects.

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19 **88.** A polyarchical query language data structure as recited in claim 83,
20 wherein the third data field further comprises a dimension information indicator
21 for specifying a particular direction and a particular depth within which to present
22 a data relationship between a complex object of the one or more objects and one or
23 more different objects of the one or more objects.

89. A polyarchical query language data structure as recited in claim 83,
wherein each data field is expressed in an XML data format.

90. A polyarchical query language data structure as recited in claim 83,
wherein the particular schema provides access to only a first subset of the objects
to provide access control to the objects.

91. A computer-readable medium comprising a polyarchical query
language data structure as recited in claim 83.